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Quarterly Journal of the Florida Academy of Sciences



Vol. 28

September, 1965

No. 3

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QUARTERLY JOURNAL OF THE FLORIDA ACADEMY OF SCIENCES

Editor: Pierce Brodkorb

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Published by the Florida Academy of Sciences

Printed by the Pepper Printing Company

Gainesville, Florida

QUARTERLY JOURNAL
of the
FLORIDA ACADEMY OF SCIENCES

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NOTES ON THE EOCENE BRACHYURA OF FLORIDA

JACKSON E. LEWIS AND ARNOLD ROSS

THE Ocala Limestone of Eocene (Jacksonian) age in peninsular Florida contains a relatively small brachyuran fauna to which several new species have recently been added (Ross and Scolaro, 1964; Ross, et al., 1964). In addition to material already on hand, further collecting from limerock quarries in the Williston Member of the Ocala Limestone permits the writers to expatiate on the morphology of most of the species thus far encountered in the fauna. The description of one new xanthid is also presented.

The following decapod crustaceans have thus far been recognized in the Florida Eocene fauna:

- Ocalina floridana* Rathbun (1929, p. 2)
- Stenocionops suwanneeana* Rathbun (1935, p. 95)
- Ranina georgiana* Rathbun (1935, p. 97)
- Callianassa inglisteris* Roberts (1953, p. 64)
- Calappilia brooksi* Ross and Scolaro (1964, p. 99)
- Calappa robertsi* Ross, Lewis, and Scolaro (1964, p. 187)
- Aparnocondylus ocalanus* Ross, Lewis, and Scolaro (1964, p. 193)
- Palaeocarpilius* (new species described herein)

Conspicuous by their absence from the fauna are representatives of the genera *Menippe*, *Harpactocarcinus*, *Zanthopsis*, *Panopeus*, *Dromilites*, and many others which are known to occur in the southeastern United States (Rathbun, 1935, p. 11). However, to this list of species may be added what is believed to be a new *Callianassa*, but owing to poorly preserved and insufficient material the description of this form is delayed until a later date. The present collections also contain two fragments of two unrelated forms possibly referable to the family Palinuridae. For want of more and better material neither of these is described at this time.

Of the species listed above *Ranina georgiana* is new to the Florida Eocene. *Palaeocarpilius* is represented by nine species in Europe, Asia, and Africa, ranging in age from Eocene to Miocene (Glaessner, 1929, pp. 291-294). This is the first reported occurrence of this genus in North America.

Family XANTHIDAE

Genus *Ocalina* Rathbun, 1929

Ocalina floridana Rathbun, 1929

Ocalina floridana Rathbun, 1929, Proc. U. S. Nat. Mus., no. 2786, vol. 75, art. 15, p. 2, pls. 1-3, Williston Member [?], Ocala Limestone, Upper Eocene, Ocala, Marion County, Florida (type locality).

Ocala [sic] *floridana*: Rathbun, 1935, Geol. Soc. Amer. Spec. Paper no. 2, p. 11.

Ocalina floridana: Rathbun, 1935, Geol. Soc. Amer. Spec. Paper no. 2, p. 87 (no description or figures).

The present species is one of the most common elements in the Ocala fauna. However, the majority of the specimens are dactyli, and fragments of the manus or carapace margins. All of them belong, apparently, to large forms.

The smallest carapace thus far recovered is nearly complete and measures 36.1 mm in width, 24.5 mm in length. The dorsum of this juvenile is characteristically tuberculate with conical tubercles, ". . . largest about the anterior and antero-lateral regions, smallest and more or less coalescent across the posterior third of the carapace, highest and most acute near the lateral angle . . ." (Rathbun, 1929, p. 2). The mesogastric region is free of tubercles, as was noted by Rathbun, but the metagastric, urogastric, and cardiac are not. The limits of these regions are, for the most part, poorly defined.

Large, movable fingers of the female may be recognized by four rows of tubercles, on the upper surface, which do not extend to the tip. The outer and inner rows are separated from the two, somewhat coalescent, superior rows by a deep sulcus. The furrows continue distally as a row of punctae. A few scattered punctae also occur on the inner surface. In addition, there are two short rows of punctae on the inner and outer surfaces immediately above the inferior margin. A juvenile male, with the proximal and superior edges of the manus wanting, exhibits only one broad

row of tubercles spanning the superior margin. No well preserved large specimens of the movable finger of the male have been recovered by the authors.

Age and sex differences are strikingly noticeable on the chelipeds, a fact that Rathbun (1929) failed to point out. Juvenile males possess a deep sulcus on the manus that arises at the infero-proximal end distal to the spatulate articulation process for the carpus, and gradually ascends on the outer surface of the manus, reaching its apex where the fixed finger meets the manus, then descends on the outer surface of the fixed finger, terminating near its tip. The distal one-half of the sulcus contains punctae. This sulcus is much shorter on the adult form, extending from the region where the fixed finger unites with the manus to near the tip of the finger (see Rathbun, 1929, pl. 2, fig. 2, and pl. 3, fig. 1). On small females the sulcus extends from the outer, inferior tip of the fixed finger, gradually rises across the lower outer surface of the manus, and terminates below the mid-line, distal to the carpal orifice. Near the union of the fixed finger and the manus the sulcus shallows becoming a row of punctae beneath which there is a row of very low, conical, tubercles.

Rathbun (1929, pl. 3, fig. 1) cited paratype A as a male specimen. Paratype D (pl. 2, fig. 2) is here reported to be a male also.

Tuberculation on the manus of large males is limited to four well defined rows, two on the crest and two on the outer face, the lower of which parallels the superior margin of the hand. This row is continued on the fixed finger parallel to its superior margin. These superior and lateral rows bear high, conical tubercles between which occur a large number of lower, randomly scattered tubercles. A few of the tubercles in the lower rows are coalesced, but not systematically. The tubercles of the superior margin are low proximally, gradually increasing in height distally. They are separated from one another by distances equal to, or greater than, their own width.

The manus of large females is characterized by far greater numbers of tubercles. One row of tubercles occurs on the outer superior surface of the fixed finger, and extends, parallel to the ascending margin of the finger, on to and across the manus; the tubercles abruptly diminish in size proximal to the union of the manus and fixed finger, becoming almost indistinguishable on all but juveniles. Above this poorly defined row, the outer surface of the manus is

ornamented with three distinct, arcuate rows of tubercles that parallel the superior margin; the middle one consists of much smaller tubercles than those found in the rows above and below it, and they gradually diminish in size distally. Numerous, randomly scattered, large and small tubercles occupy the area between the uppermost of the three rows and a deep sulcus. The sulcus, poorly developed on small specimens, is arcuate, and extends from the proximal to the distal end of the manus below the superior margin, being higher at the proximal than at the distal end. Immediately above the sulcus, and parallel to it, there is a row of tubercles increasing in size distally. The distal tubercle is about three times the size of the proximal. The tubercles in the outer of the two rows which crown the superior margin are large, and their tips are inclined distally. The inner row consists of both large and small tubercles similarly oriented. The two superior rows are not clearly delimited on large forms, but rather somewhat coalescent. However, they are well defined on juveniles. A single row of tubercles occurs on the upper slope of the inner surface. They are smaller than the smallest tubercles found on the superior margin.

Insufficient material does not permit comment, at this time, on the sexual dimorphism of the carapace.

Occurrence. Limerock quarry on the south side of Florida Highway 24, S.W. $\frac{1}{4}$, N.W. $\frac{1}{4}$, Sec. 22, Township 10 S., Range 19 E., about 4.3 miles southwest of the junction of U. S. Highway 441 and Florida Highway 24, in Gainesville, Alachua County, Florida; Williston Member, Ocala Limestone, Upper Eocene; N. G. Langford collector, 1961.

Limerock quarry on the east side of Florida Highway 235 at the town of Haile, N.E. $\frac{1}{4}$, N.W. $\frac{1}{4}$, Sec. 24, Township 9 S., Range 17 E., Alachua County, Florida; Williston Member, Ocala Limestone, Upper Eocene; Jackson E. Lewis and Arnold Ross collectors, April, May, June, 1965.

Genus *Palaeocarpilius* Milne-Edwards, 1862

Palaeocarpilius brodkorbi, new species

Diagnosis. Carapace arched, oval-rounded in outline, and about twice as broad as long. Dorsal surface almost smooth with ornamentation of numerous, minute pits. Regions poorly defined although slight depressions indicate outline of cardiac region more

noticeably on larger specimens than on smaller ones. Fronto-orbital width about one-half the greatest carapace width. Front produced markedly downward and forward; it is bilobate with a distinct notch at the anterior extremity. Borders thickened and prominently rimmed, each side bearing four low, weakly defined teeth antero-laterally and two stronger protuberances setting off the inner and outer orbital angles; the posterior tooth, at the lateral extremity, is more prominent than its neighbors and is sit-

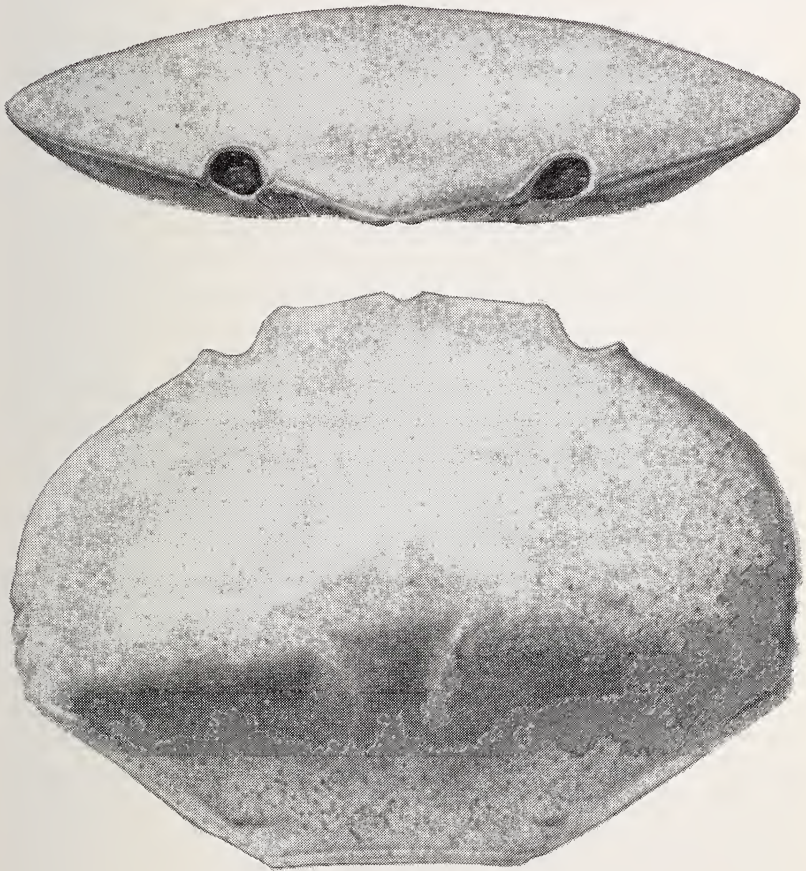


Fig. 1. Reconstructed front (top) and dorsal (bottom) views of *Palaeocarpilius brodkorbi*, new species. Holotype, U.S.N.M. no. 649417. Actual width of specimen 29.3 mm. Drawings prepared by Miss Sue Ellen Hirschfeld.

uated on a straight elevated ridge occupying one-third of the postero-lateral margin.

Description. The dorsal surface is convex in both directions. Laterally, it is smoothly curved with a slight flaring at the thickened lateral margins; longitudinally, it is more highly arched anteriorly, the axis of curvature being located well forward about one-third of the length from the anterior border. The entire dorsal surface is heavily pitted while the concave sub-hepatic and sub-branchial surfaces bear a few, randomly oriented pits. The pitting on the dorsum is less noticeable on larger specimens.

The antero-lateral borders are entire, thick, and strongly arched, extending to the orbits. The tooth formed by extensive thickening of the rim at the outer orbital angle is more prominent than the one at the inner orbital angle. The orbits are nearly circular and are largely dorsal and directed forward and slightly outward. Orbital margins are entire and are more highly ridged dorsally than ventrally; the basal article of the antenna is inserted from beneath obliquely into the inner orbital angle. The thickened and elevated dorsal orbital margin is continuous over the frontal border.

Postero-lateral borders are strongly convergent; the short, smooth, elevated ridge bearing a tooth at the lateral extremity is straight while the posterior two-thirds of the border is unthickened and slightly concave. A knobbed protuberance erupts on each side of the carapace adjacent to, but separated from, the more highly concave, thickened and heavily rimmed posterior border. The posterior border is less than one-fourth of the total carapace width.

Remarks. *Palaeocarpilius brodkorbi* is at present the only known representatives of this genus in North America. Of the described forms, *P. simplex* Stoliczka has a somewhat similar outline, but it is significantly broader and lacks the lateral teeth. Furthermore, the front of *P. simplex* is neither bilobate nor shovel-nosed. *Palaeocarpilius macrochelius* (Desmarest) has more and larger teeth, most of which are concentrated more anteriorly than laterally. On *P. brodkorbi* the teeth project upward rather than outward from the margin of the carapace. In addition, the general outline of the anterior and antero-lateral portions of the carapace of *P. macrochelius* is more rounded and the posterior margin is broader. Both *P. simplex* and *P. macrochelius* attain sizes appreciably larger than *P. brodkorbi*.

The sex of the holotype and paratypes cannot be determined at present.

Measurements of Holotype. The following measurements were made in conformance with definitions presented by Rathbun (1930, p. 4). Length of carapace 21.0; width of carapace 29.3; height of carapace 8.1; exorbital width 16.4 mm.

Measurements of Paratypes. Only one paratype is sufficiently complete to yield meaningful parameters. Length of carapace 15.9 (front partially destroyed); width of carapace 22.3; exorbital width 13.6 mm.

Type Locality and Horizon. Limerock quarry on the east side of Florida Highway 235 at the town of Haile, N.E. $\frac{1}{4}$, N.W. $\frac{1}{4}$, Sec. 24, Township 9 S., Range 17 E., Alachua County, Florida; Williston Member, Ocala Limestone, Upper Eocene; Arnold Ross collector (holotype), February 29, 1964; Jackson E. Lewis and Arnold Ross collectors (paratypes), April, May, June, 1965.

Type Depository. The holotype (text-fig. 1) and one paratype (not figured) are deposited in the collections of the U. S. National Museum, catalogue numbers 649417 and 649418, respectively. The remaining four incomplete paratypes (not figured) are retained in the authors' collections.

Etymology. This new species is named in honor of Dr. Pierce Brodkorb, Department of Zoology, University of Florida, Gainesville.

Family CALAPPIDAE

Genus *Calappa* Weber, 1795

Calappa robertsi Ross, Lewis, and Scolaro, 1964

Calappa robertsi Ross, Lewis, and Scolaro, 1964, Quart. Jour. Florida Acad. Sci., vol. 27, no. 3, p. 187, text-figs. 2a-d; Williston Member, Ocala Limestone, Upper Eocene, near Williston, Levy County, Florida (type locality).

A few additional fragments of this species have been recovered from a limerock quarry at the town of Haile. Included in this material are movable fingers of both the major and minor chelae.

The left dactylus, the distal end of which is broken away, is long (7.1 mm maximum length), slender and slightly curved. The outer surface and superior margin are tuberculate with only the tubercles of the superior margin continuing to the extremity. With the exception of one row on the outer superior margin all of the

tubercles appear to be randomly arranged. Tubercles are of two sizes, the larger predominating on the outer surface, the smaller on the superior. The inner surface is marked by four large tubercles originating proximally below the superior margin and terminating about one-third the way down the finger near the mid-line, from whence a low, broad ridge presumably continues to the tip. The inferior margin bears no less than five teeth, a hiatus separating the three proximal from the two distal ones. More detailed description of the teeth is not feasible at this time owing to poor preservation.

The right dactylus is distinguished from the left by its greater stoutness, its scimitar shape, and a moderately large, prominent, lobe depending from the outer proximal surface. Granulation on the superior outer surface is essentially the same as that found on the left dactylus. A few large, randomly arranged tubercles extend on to the outer surface of the lobe. The proximal superior surface is broad and gradually slopes downward on the outer side, but drops off abruptly on the inner side. Surmounting the inner crest of the finger, proximally, there is a short, moderately narrow, elongate ridge that is sparsely covered with small tubercles. Dentition of the inferior margin is limited to five or six, low, evenly spaced teeth. The inner surface is, for the most part, devoid of tubercles although randomly oriented sparse concentrations appear at the distal end and just above the inferior margin. A few punctae occur along the mid-line of the inner surface having served probably as sites for tactile hairs.

In the author's previous paper no mention was made of the dentition on the fixed finger of the major propodus. Of the four specimens newly available all possess, proximally, one large, broad, flat-topped tooth that parallels, more or less, the basal margin of the propodus. Two significantly smaller, narrow, blunt teeth are situated on the slope leading to the spatulate termination of the fixed finger; the distal tooth is approximately one-half the size of the middle tooth.

Heavy staining obscured the color pattern on the type material. The movable fingers have a small pigment patch on the superior proximal surface which extends relatively farther distally on the left dactylus than on the right. The manus and fixed finger are uniformly pigmented with the exception of a wide zone adjoining the dentition of the finger on both sides, the superior surface of the

stout lobular projection and intervening sulcus, and a narrow zone parallel to the dactylar orifice on both sides. These areas are presently white, but probably during life they were lightly pigmented with a pale color. The presently pigmented areas of the propodus are bluish-brown.

Occurrence. Limerock quarry on the east side of Florida Highway 235 at the town of Haile, N.E. $\frac{1}{4}$, N.W. $\frac{1}{4}$, Sec. 24, Township 9 S., Range 17 E., Alachua County, Florida; Williston Member, Ocala Limestone, Upper Eocene; Jackson E. Lewis and Arnold Ross collectors, April, May, June, 1965.

Genus *Calappilia* Milne-Edwards, 1873

Calappilia brooksi Ross and Scolaro, 1964

Calappilia brooksi Ross and Scolaro, 1964, Quart. Jour. Florida Acad. Sci., vol. 27, no. 2, p. 99, text-figs. 1, 2, 3a-e; Williston Member, Ocala Limestone, Upper Eocene, near Citra, Marion County, Florida (type locality).

Ross and Scolaro (1964, pp. 103-104) based their description of this species on seven specimens collected from four different localities in Alachua and Marion counties. A few additional specimens of *C. brooksi* have been collected from the same localities, in addition to one new locality in Sumter County, thus extending somewhat the southern range of this species.

Calappilia brooksi may be recognized by its small size and strongly tuberculate carapace. Noteworthy is the fact that the "anterior branchial region is ornamented with five strong protuberances arranged in a circle surrounding a small tubercle. Two tubercles on the branchial region and three on the hepatic form a second circlet on the dorsum" (Ross and Scolaro, 1964, p. 99).

Two specimens, both with well preserved posterior margins, confirm that the posterior margin is smooth between the two posterior tubercles as illustrated in the reconstruction presented by Ross and Scolaro (1964, text-fig. 2).

One specimen, with the anterior end incomplete, measures 21.7 mm in length, thus exceeding the greatest length of any previously known specimens by 1.8 mm.

Occurrence. Limerock quarry of the Dixie Limestone Products Company, Coleman Plant, on the south side of U. S. Highway 301, Sumter County, Florida; Williston Member, Ocala Limestone,

Upper Eocene; Claire V. Dolliver and Arnold Ross collectors, September 30, 1964.

Calappidae, gen. et sp. indet.

One fragment of a left merus is tentatively referred to the oystomatous family Calappidae. It may belong to either *Calappa*, *Calappilia* or *Aparnocondylus*. All of the exposed external surface is devoid of ornamentation, thus excluding assignment to *Calappa robertsi* (see Ross, et al., 1964, p. 191). The transverse wing-like expansion bears at least four broad, erect teeth which increase in width and height ventrally.

Occurrence. Limerock quarry on east side of Florida Highway 235 at the town of Haile, N.E. $\frac{1}{4}$, N.W. $\frac{1}{4}$, Sec. 24, Township 9 S., Range 17 E., Alachua County, Florida; Williston Member, Ocala Limestone, Upper Eocene; Arnold Ross collector, June 13, 1965.

Family RANINIDAE

Genus *Ranina* Lamarck, 1801

Ranina georgiana Rathbun, 1935

Ranina georgiana Rathbun, 1935, Geol. Soc. Amer. Spec. Paper no. 2, p. 97, text-fig. 2, pl. 21, figs. 7, 8, Glendon Limestone, Lower Oligocene, Decatur County, Georgia (type locality).

In addition to the type locality near Bainbridge, Georgia, Rathbun (1935, p. 98) cited one other lower Oligocene occurrence of *R. georgiana*, namely St. Stephens Bluff, Tombigbee River, Alabama. Numerous fragments of this species are often encountered in limerock quarries in the Williston Member of the Ocala Limestone of Late Eocene age in Alachua, and Marion counties. The Florida localities listed below extend its geographic range farther southward. In addition, its presence in the Upper Eocene (Jacksonian) also extends its known geologic range.

Ranina georgiana is easily recognized by the characteristic transverse pectinated ridges, not always continuous across the carapace, the distal end of each point in the row bearing a small pit, and the points separated by a furrow. In front of each ridge there is a moderately deep sulcus. One of the specimens in the collection bears 18 ridges on the left side of the carapace, 17 on the right. Rathbun (1935, p. 98) noted 17 ridges along the left side on one of the specimens she examined.